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[Issued with Army Orders for October, 1923.]

## GUN DRILL

FOR - 7. OCT. 1926

3-inch (20 cwt.) Q.F. A.A. Gun, Marks I and III.

ON

- (a) Motor Lorry Mounting ;
- (b) Fixed Mounting or Travelling Platform.

1923.



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*By Command of the Army Council,*

*H. Greedy*

THE WAR OFFICE,

October, 1923.

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## GENERAL INSTRUCTIONS.

Practical instruction in the equipment should be given to each recruit before any attempt is made to instruct him in gun drill. In teaching the duties of each man at the gun, the instructor should try to do so by reasoning rather than by a long explanation in words. By means of question and answer he should try to draw from the recruit the correct solution as to his duties, being careful to lead the man's mind into the desired channel of thought. Should this attempt fail, the instructor should give a demonstration emphasizing the points the recruit has not grasped. Such demonstration should deal with the work of each man in the detachment; and all men under instruction should, in turn, carry out the work of each particular man.

Instruction in gun drill should begin as soon as the men are conversant with all parts of the equipment, and can handle in the best and quickest manner each of the working parts of the gun. Once the work of each man has been thoroughly mastered, it should not take long for the recruit to learn the actual drill.

It is most important that a marked distinction should be drawn between instruction and drill.

During the former the language used should be as simple as possible, and the meaning of all technical terms which are necessary must be carefully explained. A conversational tone should be adopted, and under no circumstances whatever should anything in the nature of long quotations from drill books be allowed. The men should be permitted to assume an easy attitude and their interest should not be allowed to flag. They should be encouraged to ask questions.

At drill, on the contrary, rigid discipline must be maintained; orders must be clear and decisive, and the detachments made to work steadily, smartly, and rapidly. At the same time the utmost accuracy is essential, and any deviations from the methods laid down must at once be checked.

## PART I.—MOTOR LORRY MOUNTING.

### CHAPTER I.

#### GENERAL DUTIES.

This chapter summarizes the duties of the section commander and each man in the detachment. It is only intended as a guide for the instructor, who should use his own words in explaining the various duties to the men.

The detachment is composed of twelve men. The service of the gun is divided between them as follows :—

1	...	...	...	In command.
2	...	...	...	Layer for line.
3	...	...	...	Layer for elevation.
4	...	...	...	Setter for vertical deflection.
5	...	...	...	Setter for lateral deflection.
6	...	...	...	Setter for tangent elevation.
7	...	...	...	At the breech.
8	...	...	...	Loader.
9, 10 and 11	...	...	...	Ammunition supply.
12	...	...	...	Driver and assists with ammunition supply.

The duties of the section commander and each man are as follows :—

#### DUTIES OF SECTION COMMANDER.

*Note.*—In action the section commander will only be in direct command of his section when detached.

1. He COMMANDS his section and is responsible for the serviceability of its EQUIPMENT and the correctness of its DRILL.

2. He supervises the TESTING and ADJUSTMENT of the sights of his section.

3. He sees that the BEARING SCALES of his guns are properly ORIENTED.

#### DUTIES OF 1.

1. He COMMANDS and is responsible for the entire service of his gun.

2. He gives the WORDS OF COMMAND detailed for him in Chapter II, and repeats all ORDERS affecting his detachment, which have not been heard by the men concerned. His orders must be given clearly, but no louder than is necessary to enable his detachment to hear.

For the first round of each group he orders "Fire."

Before giving this order, he sees that his gun is in all respects ready.

He assists in passing orders down the battery when necessary.

He reports "On target" and "Target lost."

He acknowledges all orders by saluting. He will salute with the hand nearest the command post, finishing with the hand vertically above the head.

3. He is responsible :—

- (i) That the BUFFER is properly filled, that the piston rod is firmly nutted up to the lug of the gun and the control plunger to the cradle, and that the spring tension rods are properly connected up.

- (ii) That there is no leakage at the GLANDS.
- (iii) That the PROTRUSION of the STRIKER is correct.
- (iv) That the SIGHTS are tested. This is done under the supervision of the section commander.

To ascertain if the BUFFER is properly filled he removes the filling-hole plug on the tank and the drain plug on the rear of the buffer, and sees that the tank is full.

4. He selects the POSITION for his gun, which should be on firm and level ground. He supervises the LEVELLING of the gun.

5. He occasionally examines the setting of the DEFLECTION SCALES and TANGENT ELEVATION DIAL.

6. He supervises the preparation and supply of AMMUNITION.

#### DUTIES OF 2.

- 1. He TRAVERSES and lays the gun for line by keeping the vertical wire of his telescope on the nose of the target.
- 2. In picking up a target, and when the target is difficult to see, he will use the open sight.

#### DUTIES OF 3.

- 1. He ELEVATES and lays the gun for elevation by keeping the horizontal wire of his telescope on the nose of the target.
- 2. In picking up a target, and when the target is difficult to see, he will use the open sight.



3. He is the MASTER-LAYER. As soon as his sight is first layed on the target he will give "On target." If for any reason the gun ceases to be layed, he will give "Target lost."

#### DUTIES OF 4.

He sets the VERTICAL DEFLECTION and corrections, as ordered.

#### DUTIES OF 5.

He sets the LATERAL DEFLECTION and corrections, as ordered.

#### DUTIES OF 6.

He sets the TANGENT ELEVATION dial by keeping the reader on the fuze curve ordered.

#### DUTIES OF 7.

1. At HAND LOADING, he opens and closes the breech.

To OPEN the BREECH :—He takes hold of the handle of the lever breech mechanism with his right hand, releases the catch by pressing the handle towards the gun, lowers it to the rear to the fullest extent, and releases the pressure of his hand as soon as the breech block is held by the extractors.

This is most important, as it allows the next round to slide home into the chamber and be held there by the action of the buffer block spring.

To CLOSE the BREECH :—As soon as the extractors have disengaged the breech block he raises the lever breech mechanism with his right hand to the fullest extent.

When the breech is closed he keeps his left hand on the breech ring until the gun is fired.

2. At all times he keeps the gun platform clear of empty cases.

With the *MARK III GUN* he opens and closes the breech as follows :—

To OPEN the BREECH :—He takes hold of the lever breech mechanism with his left hand, presses in the catch-retaining, raises the lever and draws it smartly towards him. After the fired cartridge case has been ejected, he must not hold the breech in the fully open position, but should allow the catch-retaining carrier open to rest in the slot provided for it in the breech ring; otherwise 8 will be unable to load.

To CLOSE the BREECH :—He takes hold of the lever breech mechanism with his left hand and forces it smartly away from him and downwards as far as it will go. When the breech is closed, he keeps his left hand on the breech ring until the gun is fired.

#### DUTIES OF 8.

##### 1. He LOADS.

To LOAD :—He receives the round from 9 in the palm of the left hand near the point of balance, his right hand clenched against the base of the cartridge, thumb uppermost. He

should hold the round with the fuze higher than the base of the cartridge. He places the head of the shell in the bore, being careful not to strike the breech, and forces the round well home until held by the action of the buffer block.

2. As soon as the first round is loaded, he sets the clutch lever to S.A. unless "Hand loading" has been ordered.

(N.B.—Great care must be taken to see that the clutch lever is never moved except when the breech is fully closed.)

3. He FIRES, and turns to receive another round.

To FIRE:—He pulls the handle of the firing lever smartly to the rear as far as it will go and releases it at once.

For the first round of each group, he awaits the order "Fire" from 1 before firing the gun.

He will be careful not to fire the gun after "Target lost" is given.

*With the MARK III GUN:—*

To LOAD:—He receives the round from 9 in the palm of the left hand near the point of balance, his right hand clenched against the base of the cartridge, thumb uppermost. He should hold the round with the fuze higher than the base of the cartridge. He places the head of the shell in the bore, being careful not to strike the breech, and forces the round well home until held by the action of the catch-retaining cartridge.

He FIRES, and turns to receive another round.

To FIRE:—He pulls the handle of the firing lever smartly to the rear as far as it will go and releases it at once.

For the first round of each group, he awaits the order "Fire" from 1 before firing the gun.

He will be careful not to fire the gun after "Target lost" is given.

DUTIES OF 9.

1. He receives AMMUNITION from 10 and 11, and holds the round with both hands underneath, fuze to his right.
2. He passes ammunition to 8.
3. He assists 10 and 11 in preparing ammunition.

DUTIES OF 10 AND 11.

1. Supply AMMUNITION to 9 with fuzes set as ordered, carrying the round with the right hand at the base of the cartridge case, and supporting it on the palm of the left hand at the point of balance.
2. Assisted by 9 and 12, they REMOVE CLIPS and FUZE COVERS, and are responsible that the FUZES are PROPERLY SET as ordered.
3. 10 keeps 1 informed as to the number of rounds required to replenish the racks.

DUTIES OF 12.

1. He attends to the tightening of JACKS and WHEEL SCOTCHES in action.
  2. He assists 10 and 11 in preparing AMMUNITION.
  3. He REPLENISHES the RACKS with rounds set at the correct fuze.
-

## CHAPTER II.

## GUN DRILL.

This chapter details the orders given and the procedure by which these orders are carried out in batteries armed with the 3-inch 20 cwt. Q.F. A.A. Gun on Motor Lorry Mounting.

The procedure must be memorized and strictly adhered to.

The executive order is shown throughout as being given by the section commander, as will normally be the case during training. In action the executive order will normally be given by the fire unit commander. When orders can be heard throughout the battery, they will be acted upon without repetition. Instructors will invariably employ the orders detailed for the section commander, even when drilling a single detachment.

## 1. POSITIONS AT DETACHMENT REAR.

The detachment falls in two deep, one pace between ranks, **1** on the right of the front rank, three yards in rear of the lorry, and covering the off wheel. **1** is not covered. **12** is on the left of the front rank.

## 2. TO TELL OFF.

Section commander.

" . . . section—*Tell off.*"

**1** numbers himself **1**, the right-hand man of the rear rank **2**, his front rank man **3**, and so on.

### 3. TO CHANGE ROUND.

Section commander.

" . . . section—*Change round.*"

1 takes a pace to the rear with his right foot and a pace to the left with his left foot. The left-hand man of the rear rank takes two short paces to the front. At the same time the remainder of the front rank take two short paces to the right and the rear rank two short paces to the left. 12 does not move.

(The detachment is then again told off.)

### 4. POSITIONS WHEN MOUNTED.

1, on the left of the driver.

4, 2, 3 and 5 on the front lorry board from near to off, facing the gun.

8, 6, 7 and 9 on the rear lorry board from near to off, facing the gun.

10 and 11 on the gun seats on their own side.

12 at the wheel.

Even numbers on the near side, odd numbers on the off, except 1 and 12.

### 5. TO MOUNT.

Section commander.

" . . . section—*Prepare to mount.*"

1 takes a pace to the rear and turns to his left.

The front rank except 12 turn to the right, the rear rank to the left, and double to their positions as follows :—

1 opposite the driver's seat on the near side of the lorry.

2 and 3 opposite the front of the rear wheels.

4 and 5 opposite the front jacks.

6 and 7 opposite the rear jacks.

8 and 9 opposite the rear corners.

10 and 11 opposite the rear wheels.

12 in front of 1.

All facing inwards.

Section commander.

" . . . section—*Mount.*"

The detachment spring into their places and sit upright, knees together, and hands gripping the lorry boards.

#### 6. TO EXAMINE EQUIPMENT.

Examination of equipment will be carried out before leaving the gun park. When in action, this procedure should be carried out at least once in every 24 hours, and advantage should be taken of any interval to examine and test equipment.

Section commander.

" . . . section—*Examine equipment.*"

The section commander supervises the testing of sights and grouping of ammunition.

1 sees that the bore is clear, that the gun, buffer and spring tension rods are properly connected up. He sees that the buffer is correctly filled, and that there is no leakage from the glands.

He tests and adjusts the sights.

He tests protrusion of the striker, and generally supervises the work of the remainder of the detachment, satisfying himself that spare parts are interchangeable, small stores complete, and the equipment is in all respects ready for action.

He orders 2 and 3 to test the traversing and elevating gears as soon as 7 and 8 have completed their duties.

2 removes and replaces the muzzle cover, fixes his telescope in the bracket, focusses it, and sees that it is correctly adjusted. Adjusts his seat, head rest and foot rest, sees that the traversing gear is oiled, and when ordered by 1 traverses the gun through a large arc, and sees that the gear is in good working order.

He assists 1 to test and adjust the sights.

3 removes and replaces the breech cover, fixes his telescope in the bracket, focusses it, and sees that it is correctly adjusted. He adjusts his seat, head rest and foot rest, sees that the elevating gear is oiled, and when ordered by 1 elevates and depresses the gun through 90 degrees, and sees that the gear is in good working order.

He assists 1 to test and adjust the sights.

4 sees that the vertical deflection scale is in good working order, leaving it set at zero.

5 sees that the lateral deflection scale is in good working order, leaving it set at zero.

6 sees that the tangent elevation dial is in good working order, and that the reader follows the zero fuze line while the gun is elevated from 0 to 90 degrees. He leaves it set at zero.



**7** and **8** examine the breech and firing mechanism and test the semi-automatic gear.

They assist **1** to test the protrusion of the striker.

**8** tests the firing gear.

**9** and **10** examine the ammunition, see that the primers are screwed home and the fuzes set as ordered.

**11** and **12** run the engine and examine the lorry, jack-arms, and jack-screws.

As soon as the examination is completed the detachment form detachment rear.

**1** collects reports and reports to the section commander, "No. . . . ready for action" or otherwise.

#### 7. TO COME INTO ACTION.

Whenever time permits, the section commander will halt his section clear of the position and point out the approximate position of each gun before ordering "Action."

Section commander.

" . . . section—Action."

**1** orders "Halt."

**12** pulls up, but does not stop his engine.

**1** sees that the gun is placed in a satisfactory position, and then orders "Action."

**4, 5, 8** and **9** lower the lorry sides.

The detachment if mounted dismount, with the exception of **2, 3** and **12**.

**1** supervises the levelling of the platform.

**2** and **3** remove travelling crutch and hand it to **12**.

**2** removes muzzle cover and places it on the driver's seat, removes pin securing traversing gear, fixes and focusses his sighting telescope and uncaps the foresight.

**3** removes breech cover and places it on the driver's seat, removes pin securing elevating gear, fixes and focusses his sighting telescope and uncaps the foresight.

He elevates the gun to 30 degrees.

**4** and **5** remove the front blocks and place as many as necessary under the front jacks, release pins securing jacks, and stand by to jack up under the orders of **1**.

**6** and **7** remove rear blocks.

**8** and **9** unpin rear jack arms.

**6**, **7**, **8** and **9** withdraw rear jack arms, place as many blocks as necessary under rear jacks, release pins securing jacks, and stand by to jack up under the orders of **1**.

In jacking up **4**, **6** and **8** work on near side, **5**, **7** and **9** on off side of lorry.

**10** and **11** open the ammunition boxes and prepare ammunition for issue.

**12** puts on the brake, stops the engine and dismounts.

He receives the travelling crutch from **2** and **3** and places it clear.

He scotches the lorry wheels when ordered by **1**.

As soon as the platform is level, **1** orders "Scotch up."

**4**, **5**, **6**, **7** and **8** mount on to the lorry.

**4** sets the vertical deflection scale to zero.

**5** sets the lateral deflection scale to zero.

**6** sets the tangent elevation dial at fuze 16.

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A 3

7 opens the breech, puts on knee pad and gloves.  
 8 puts on knee pad and loading gloves.  
 9 and 12 assist 10 and 11 with ammunition.  
 The detachment take up their positions in action.

#### 8. POSITIONS IN ACTION.

1 where he can best supervise his detachment.  
 2 on the seat on the right of the gun.  
 3 on the seat on the left of the gun.  
 4 on the step opposite the vertical deflection scale.  
 5 opposite the lateral deflection scale.  
 6 opposite the tangent elevation dial.  
 7 on the right rear of the breech facing the lever breech mechanism.  
 8 on the left rear of the breech facing 7.  
 9 where he can best supply 8 with ammunition.  
 10 and 11 at the most convenient ammunition racks.  
 12 at the most convenient position to attend to the jacks and scotches.

#### 9. TO FORM DETACHMENT REAR IN ACTION.

Section commander.

" . . . section—*Detachment rear.*"

1 doubles to his place (three yards in rear of the lorry and covering the off wheel) and gives the order "*No. . . . Double march.*" At the order from 1 the remainder double to their places and halt.

**10. To TAKE POST FROM DETACHMENT REAR.**

Section commander.

" . . . *section—Take post.*"

The detachment double to their positions in action.

**11. To LOAD.**

Section commander.

" . . . *section—Fuze. . . .*"

**10** or **11** supply **9** with a round set at the fuze ordered.

**9** passes the round to **8**.

**8** loads at once.

**7** closes the breech and places his left hand on the breech ring (at hand loading only).

**8** sets clutch lever to S.A. unless "Hand loading" has been ordered.

*With the MARK III GUN :—*

**10** or **11** supply **9** with a round set at the fuze ordered.

**9** passes the round to **8**.

**8** loads at once.

**7** closes the breech and places his left hand on the breech ring.

**12. To UNLOAD.**

No. **1**.

"*No. . . . Unload.*"

**8** sets the clutch lever to *II*.

**7** opens the breech slowly.

(B 27/79)

8 withdraws the round and hands it to 9, who places it on the ground.

10 or 11 replace the round in the ready rack when opportunity occurs.

*With the MARK III GUN:—*

7 opens the breech slowly.

8 withdraws the round and hands it to 9, who places it on the ground.

10 or 11 replace the round in the ready rack when opportunity occurs.

#### 13. TO LAY THE GUN.

2 lays for line.

3 lays for elevation.

4 puts on vertical deflection as ordered.

5 puts on lateral deflection as ordered.

6 keeps the tangent elevation dial set to the fuze-range ordered.

#### 14. TO FIRE.

"Gun fire" is the only method of fire. The executive order is "Fire," given by the section commander.

Section commander.—"*Fire.*"

8 fires the gun. For the first round of each group, he awaits the order "Fire" from 1 before firing.

7 opens the breech (at hand loading only).

*At night.*

8 calls "Clear" and fires the gun.

7 opens the breech (at hand loading only).

The gun is loaded and fired as rapidly as possible until "Stop" is ordered or signalled by a blast on the whistle.

If the order "Fire" is preceded by an order ". . . Rounds," loading and firing will cease when the stated number of rounds has been fired without any further order.

#### 15. MISS-FIRES.

*If the gun fails to fire.*

8 satisfies himself that the breech is properly closed, re-cocks and pulls the firing lever again.

*If the gun fails to fire the second time, he calls "Miss-fire."*

1 orders "Stand clear." All men working in rear of the gun stand clear, the remainder continue their duties. After a pause of 1 minute:—

1 orders "Unload."

7 and 8 unload.

8 hands the round to 1, who examines the primer. If the primer has not been struck, 1 orders 7 and 8 to change the striker.

*If the primer has been struck, 1 hands the round to 10 or 11, who lays it on the ground about 10 yards clear.*

The normal service of the gun is resumed.

#### 16. FRESH TARGET.

Section commander.

*". . . section—Fresh target."*

2 and 3 lay the gun on the new target.

4 and 5 set the deflection scales to zero.

6 sets the tangent elevation dial to fuze 16.  
7, 8 and 9 unload.

#### 17. SCALES ZERO.

Section commander.

" . . . section—*Scale zero.*"

4 and 5 set the deflection scale to zero.

#### 18. TO STOP FIRING.

Section commander.

" . . . section—*Stop*" (or one blast on the whistle).

8 stops loading and firing. The remainder of the detachment continue their duties.

#### 19. CHANGE OF FUZE.

Section commander.

" . . . section—*Fuze.* . . ."

6 sets the tangent elevation dial to the fuze range ordered.  
8 hands his round to 9, who lays it on the ground with his own round. 9 receives from 10 or 11 a round set at the new fuze, which he passes to 8. If empty, the gun is loaded with a round set at the new fuze. If already loaded, the gun is not unloaded.

#### 20. MOVE OFF.

Section commander.

" . . . section—*Move off.*"

2 and 3 unscotch the wheels and replace scotches on lorry.

4 and 5 unscrew front jacks and replace front blocks on lorry.

6, 7, 8 and 9 unscrew rear jacks, push in jack arms and replace blocks on lorry.

10 closes ammunition lockers.

11 starts the engine.

12 takes post at the steering wheel.

The detachment resume their travelling positions and 1 gives the order "Drive on."

#### 21. CEASE FIRING.

Section commander.

" . . . section—*Cease firing.*"

7 and 8, if the gun is loaded, unload.

4, 5 and 6 bring their scales to zero.

7 closes the breech.

2 and 3 bring the gun horizontal, muzzle to the rear of the lorry.

9, 10, 11 and 12 replace ammunition and close ammunition lockers.

#### 22. PACK UP.

Section commander.

" . . . section—*Pack up.*"

2 and 3 receive the travelling crutch from 12 and place it in position, replace pins securing traversing gear, unscotch the wheels and replace scotches.

4 and 5 unscrew and pin up front jacks, replace front blocks on lorry.

6, 7, 8 and 9 unscrew and pin up rear jacks, push in and pin up rear jack arms, replace blocks on lorry.

10 replaces loose stores on lorry.

11 starts the engine.



**12** hands the travelling crutch to **2** and **3** and takes post at the steering wheel.

All stores are replaced. On completion of their duties the detachment mount to their travelling position, **4**, **5**, **8** and **9** raise and secure the sides of the lorry.

### 23. CASUALTIES TO DETACHMENTS.

Men sent to replace casualties report to their section commanders, who order such changes of duties as they consider necessary.

Casualties are replaced as follows:—

Section commander ... By the senior No. **1** of the section.

**1** ... By a named successor.

With eleven men ... **5** performs the duties of **5** and **6**.

With ten men ... **8** performs the duties of **7** and **8** (unless the S.A. mechanism is out of action).

With nine men ... **1** performs the duties of **1** and **4**.

The service of the gun requires a minimum of five men on the gun platform (six at hand loading). Ammunition numbers should not be used to replace casualties until the numbers on the platform fall below this figure.

*With the MARK III GUN:—*

Casualties are replaced as follows:—

Section commander ... By the senior No. **1** of the section.

**1** ... By a named successor.

With eleven men ... **5** performs the duties of **5** and **6**.

With ten men ... **1** performs the duties of **1** and **4**.

The service of the gun requires a minimum of six men on the gun platform. Ammunition numbers should not be used to replace casualties until the numbers on the platform fall below this figure.

#### 24. DISABLEMENT.

The extent of disablement ordered will depend upon the time available and the probability of recapture.

1. *To disable the gun so that it can be brought into action immediately after recapture.*—Remove the breech screw or block.

2. *To disable the gun so that it can be brought into action after repair.*—Bring gun to the horizontal, disconnect buffer and recuperator, then fire the gun.

3. *To destroy the gun.*—Place a fuze H.E. cartridge in the muzzle. Remove the time fuze from a second H.E. cartridge and load this cartridge in the chamber, the gain or D.A. fuze being in position. Close the breech. Disconnect the buffer and elevate to 70 or 80 degrees. Then, by means of a long lanyard, fire the gun from under cover. A length of telephone wire attached to the service lanyard is suitable for the purpose.

NOTE.—The telescopes should always be removed and taken away before a gun is abandoned.

#### 25. BLANK AMMUNITION.

1. No officer, N.C.O. or gunner who has not been trained and passed in gun drill is to command a section or form part of a gun detachment firing blank ammunition at salutes or at training.

2. When firing Q.F. blank ammunition, the cartridge is on no account to be left in the gun with the breech open.

3. *In the event of a miss-fire*, a further attempt should be made to fire the gun. In no case must the breech be opened for at least one minute with black powder, and ten minutes with smokeless charges. No one must be in rear of the breech when it is opened. In firing salutes, an officer or senior non-commissioned officer should be detailed for the special duty of timing the interval after a miss-fire and informing 1 of the gun when the breech may be opened.

4. As a further safeguard, 1 will inspect all ammunition before firing, to see that the charge is properly home in the case.

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### CHAPTER III.

#### LAYING AND FUZE-SETTING TESTS.

##### Laying Test.

1. In every A.A. battery there should be at least six qualified layers and nine qualified fuze setters per sub-section, exclusive of serjeants and lance-serjeants. A list of layers should be kept. All section commanders, serjeants and lance-serjeants should be tested periodically.

2. All officers and Nos. 1 must be thoroughly conversant with:—

- (i) The tests for and care of sighting gear and sights.
- (ii) The methods of orienting the training arcs.

3. Layers will be tested in pairs, by means of three tests:—

Test A will consist of laying on three well-defined objects at least 10 degrees apart.

Test B will consist of picking up and laying on a well-defined object while the deflection gears are turned at a steady speed. Two lays will be given in test B.

Test C will consist of three sets of vertical and three sets of lateral deflection.

4. A maximum of 10 marks will be given for each lay in test A, 20 marks for each lay in test B, and 5 marks for each lay in test C; and in order to qualify, a layer must obtain 75 per cent. of full marks, and not less than 60 per cent. in each test.

2. When firing Q.F. blank ammunition, the cartridge is on no account to be left in the gun with the breech open.

3. *In the event of a miss-fire*, a further attempt should be made to fire the gun. In no case must the breech be opened for at least one minute with black powder, and ten minutes with smokeless charges. No one must be in rear of the breech when it is opened. In firing salutes, an officer or senior non-commissioned officer should be detailed for the special duty of timing the interval after a miss-fire and informing 1 of the gun when the breech may be opened.

4. As a further safeguard, 1 will inspect all ammunition before firing, to see that the charge is properly home in the case.

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### CHAPTER III.

#### LAYING AND FUZE-SETTING TESTS.

##### Laying Test.

1. In every A.A. battery there should be at least six qualified layers and nine qualified fuze setters per sub-section, exclusive of serjeants and lance-serjeants. A list of layers should be kept. All section commanders, serjeants and lance-serjeants should be tested periodically.

2. All officers and Nos. 1 must be thoroughly conversant with :—

- (i) The tests for and care of sighting gear and sights.
- (ii) The methods of orienting the training arcs.

3. Layers will be tested in pairs, by means of three tests :—

Test A will consist of laying on three well-defined objects at least 10 degrees apart.

Test B will consist of picking up and laying on a well-defined object while the deflection gears are turned at a steady speed. Two lays will be given in test B.

Test C will consist of three sets of vertical and three sets of lateral deflection.

4. A maximum of 10 marks will be given for each lay in test A, 20 marks for each lay in test B, and 5 marks for each lay in test C; and in order to qualify, a layer must obtain 75 per cent. of full marks, and not less than 60 per cent. in each test.

5. The examiner should be assisted in all cases by another officer with a stop watch, a senior N.C.O. with a record book, and a penciller to take down the orders given for reference when checking the lays.

6. Before beginning the tests A and B at least five well-defined targets will be selected in the foreground. These targets should be numbered 1, 2, 3, 4, 5, and pointed out to the layers to be tested.

7. All orders for the lay must be given out by the examiner clearly and distinctly; thus:—

For test A—“*Target 2—Up 2—Right 3—* . . . (pause)  
*. . . —Lay.*”

For test B—“*Target 2—* . . . (pause) . . . —*Lay.*”

For test C—“*Up 4—Left 2—* . . . (pause) . . . —*Set,*” or “*1 more Up— $\frac{1}{2}$  more Right—* . . . (pause)  
*. . . —Set.*”

8. In all tests, orders will be acknowledged by 1 and acted upon at once. Should any layer or sight setter be in doubt as to any particular order, he will refer to 1, who may repeat any part of the order received. 1 may in his turn refer to the examiner.

In all tests the gun will be loaded with a drill round.

9. After checking the lay in tests A and B the examiner will throw the gun off the target.

10. Layers will be examined in pairs (2 and 3). For any incorrect portion of the lay, marks will be deducted only from the individual making the error.

11. For tests A and B 1, 2, 3, 4 and 5 will be on the gun. The examiners and detachment should not move from their place on the gun platform during a test.

12. The time allowed for each lay is as follows :—

Test A.—Six seconds.

Test B.—On the command "*Lay*" by the examiner 4 and 5 will commence to turn their deflection wheels at an even pace and will continue to do so for at least 10 seconds until they receive the order "*Stop*." Meanwhile the layers will pick up and keep their telescopes on the target.

The rate of change of deflection must not exceed  $\frac{1}{4}$  degrees per second.

(N.B.—It is essential that 2, 3, 4 and 5 all stop exactly on the word. No further adjustment of the lay is allowed.)

Test C.—Three seconds.

13. In test A, 3 will shout "*On*," and in test C each setter will shout "*Set*" when the lay or set is completed.

14. Marks will be deducted as follows :—

In test A.—One mark will be deducted for every second beyond 5 seconds to get on the target, time being taken to the nearest whole second.

In test B.—Five marks will be deducted for every 5 minutes' error in elevation or line up to 15 minutes.

In test C.—One mark will be deducted for every second beyond 3 seconds to set the sight, time being taken to the nearest whole second.



15. No marks will be given for the lay :—

In test A.—If the gun is not layed within 5 minutes for elevation or line.

In test B.—If the gun is not layed within 15 minutes for elevation or line.

In test C.—If the sight is incorrectly set.

#### Fuze-setting Test.

16. Fuze-setters will be tested by three continuous tests, each test consisting of setting five fuzes at a graduation ordered by the examiner.

17. A maximum of 20 marks will be allotted to each test, and in order to qualify 50 marks must be obtained.

18. The time allowed for each test will be 35 seconds.

19. No marks will be given for the test if any fuze is incorrectly set.

20. Two marks will be deducted for every 5 seconds over the time allowed. The time will be taken to the nearest 5 seconds.

#### Example of Tests.

Laying Tests :—The gun is in action with platform levelled, deflection scales at zero and fuze-range dial set at 15.

#### Orders.

#### Procedure.

Test A.

<i>Target 2—Up 3—Right 2</i>	4 and 5 set scales as ordered and
—(pause)—“ <i>Lay.</i> ”	2 and 3 lay gun on target.
	3 shouts “Ready” when completed.

Orders.	Procedure.
Test B.	
<i>Target 3 — (pause) —</i> <i>“Lay.”</i>	4 and 5 turn their deflection wheels at a steady rate till order “Stop” is received from the examiner.
Test C.	
<i>Up 4—Left 2—(pause)—</i> <i>“Set,” or 1 more Up—</i> <i><math>\frac{1}{2}</math> more Right—(pause)</i> <i>—“Set.”</i>	4 and 5 set scales as ordered and shout “Set.” (Two men can be tested simultaneously.)

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## CHAPTER IV.

## SIGHT TESTS.

The sights should be tested daily and after travelling or prolonged firing.

At drill these tests should be carried out frequently to give officers and N.C.Os. practice in doing them accurately.

Any adjustment to optical instruments must be carried out by a qualified artificer.

**To test the Field Clinometer.**

*To ascertain the index error—*

- (i) Set the clinometer to read zero (degrees and minutes), place the instrument on the clinometer plane of the gun, and by means of the elevating gear bring the bubble into the centre of its run. Turn the clinometer end for end. If the bubble does not remain in the centre of its run bring it there by moving the arm and slider. Note the net reading. Half this reading is the INDEX ERROR of the clinometer.
- (ii) An alternative method may be employed. Procure a clinometer known to be in adjustment, set at zero and place it on the clinometer plane, and by means of the elevating gear bring the bubble central. Remove the clinometer. The clinometer to be tested is now placed on the clinometer plane and the bubble brought central by moving the arm and slider. The actual

reading of this instrument is the INDEX ERROR. A number of clinometers can be quickly and uniformly tested in this manner.

Note (i).—A clinometer when set to read its INDEX ERROR and bubble brought central will lay the clinometer plane horizontal.

Note (ii).—When testing clinometers, 2 and 3 will be on their seats and 1 on left of breech. These positions must not be changed during the test. If several clinometers are to be tested, they must be handed to 1 by a man on the ground so that 1 need not move.

#### Alignment Tests.

- (i) See that the mounting is level.
- (ii) Remove the striker from the gun.
- (iii) Fix cross-wires to the horizontal and vertical lines at the muzzle.
- (iv) Set up the target testing sights about 50 yards from the gun; the face of the target perpendicular to the axis of the piece, and the top edge horizontal.  
Should a well-defined object over 3,000 yards away be available it may be used in place of the target, the bore and sights being adjusted on to it.
- (v) Set the tangent elevation dial and vertical deflection scale at zero.
- (vi) Set the lateral deflection scale at 10 minutes right for a gun rifled 1 in 30 and using a 16-lb. shell.  
Set the lateral deflection at zero for a gun rifled 1 in 40 and using a 16-lb. shell.

- (vii) Lay the bore by means of the elevating and traversing wheels, so that the intersection of the cross-wires falls on B when viewed through the striker hole. If the sights are in adjustment, the open sights will be found to be on O.O. and the telescopes on T.T.

If the sights are found not to be layed as above they will be adjusted as follows :—

**(a) Adjustment for Line.**

- (i) Bring the left-hand telescope on to T by means of the lateral deflection gear.
- (ii) Make the lateral deflection scale read 10 minutes right for a gun rifled 1 in 30, or at zero for a gun rifled 1 in 40. This is done by slackening the three clamping screws in the centre of the dial, turning the dial until the required reading is opposite the index and re-tightening the clamping screws.
- (iii) If the right-hand telescope is now found not to be on T, slacken off the lock nuts at each end of the tube connecting the rear ends of the deflection arms, revolve the tube until the right-hand telescope is on T, and re-tighten the lock nuts.

**(b) Adjustment for Elevation.**

- (i) Bring the left-hand telescope on to T by means of the tangent elevation gear, which is operated by the fuze-range dial hand wheel.
- (ii) Adjust the fuze-range dial so that the zero line comes under the index. This is done by slackening off the clamping screws on the rear face of the dial, revolving the dial to the required position and re-tightening the clamping screws.
- (iii) If the right-hand telescope is now found not to be on T, slacken off the three fixing screws on the back of the arc

at the rear end of the right-hand rocking bar, also the lock-nut on the adjusting screw. Turn the adjusting screw until the right-hand telescope is on T, and re-tighten lock-nut and fixing screw. Should there not be sufficient movement available in the right-hand arc, slacken off the lock-nuts on the left end of the tube connecting the forward ends of the deflection arms, revolve the tube until the right-hand telescope is on T and re-tighten lock-nuts.

All elevation adjustments can be carried out by levelling a clinometer set at zero on the clinometer plane of the gun. The adjustments for elevation can then be made as above, the bar testing sight being placed in the telescope holder and a clinometer set at zero levelled on the bar instead of the sight being brought on to T. In placing the bar-testing sight in the telescope holder, care should be taken to level it crossways and to screw down the clamping device.

#### (c) Adjustment of Open Sights.

When the bore is on B and the telescope on T, the open sights should be on O.

##### (i) *To adjust the foresights for elevation :—*

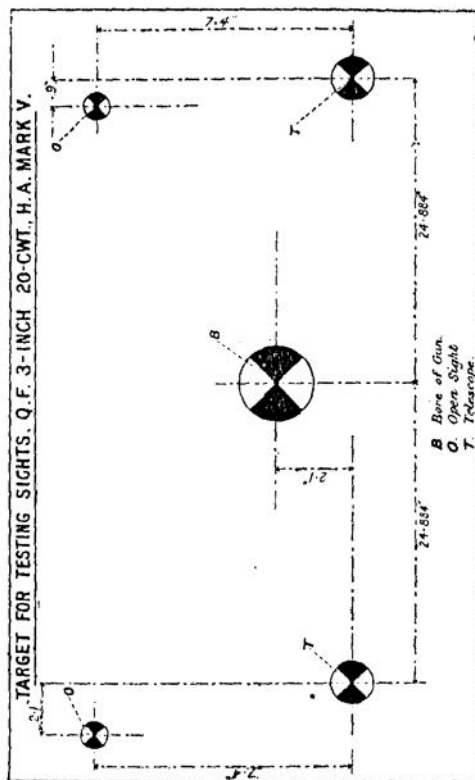
Slacken the lock-nuts, turn the foresights up or down as required and re-tighten the lock-nuts.

##### (ii) *To adjust for line :—*

Slacken the locking nuts on the hind sights, and slide the hind sights right or left as required. The hind sights also have a small adjustment for elevation.

NOTE.—When tightening locking screws and nuts, care must be taken not to disturb the adjustment that has just been made.

After completing the adjustments, a final check should invariably be carried out.



## CHAPTER V.

### CARE OF EQUIPMENT.

#### 1. CLEANING AND OILING.

Limber gunners should be intelligent and reliable men.

The projections on the exterior of the gun by means of which the gun slides in the cradle of the carriage, should be kept clean and oiled and maintained in good working order; all working surfaces should be well lubricated and kept free from paint.

The gun should be pulled back in the cradle at least once a week by a tackle or dragrope. This movement lubricates the guides and operates the packings.

The bore should be kept clean and lightly greased.

After firing it should be scrubbed out with caustic soda and hot water (1 lb. to a gallon), using the piasaba brush. When dry it should be lightly greased with mineral jelly.

No gritty substance, such as sandpaper or bath brick, should be used for cleaning working surfaces.

All spare parts should be used periodically to ensure that they are in working order.

Heads of lubricators should be kept free from paint.



## List of Lubricators.

Fitting to be lubricated.	No.	Where situated.
Body ... ..	4	For conveying lubricant to axles and rollers.
Body ... ..	2	1 in bearing arc pinion shaft and 1 bearing rack-pinion shaft.
Bracket, elevating gear (including gear, on left side) ...	7	4 for worm spindle. 1 for hand-wheel spindle. 1 in hand-wheel handle. 1 close to body for conveying lubricant to left bearings of arc pinion shaft.
Bracket, traversing gear (including gear, on right side) ...	6	1 in cover of worm wheel. 2 for worm spindle. 1 for bearing of driving handle. 2 in handle driving gear—1 in each crank sleeve.
Cradle— Body ... ..	11	10 for lubricating sliding projections on gun (5 in each side on top) and 1 near left trunnion for lubricating sight rocking arm.
Bearing, control rod ... ..	1	Centre of cradle towards the front.
Bracket, hand lever, firing gear	1	—
Bracket, rocking lever, firing gear, Part II ... ..	3	—
Lever, hand firing gear ... ..	1	—
Lever, rocking, firing gear ... ..	3	1 groove in each bearing.
Bracket, rocking lever ... ..	1	Top rear, for firing rod.
Lever, re-cocking gear ... ..	1	—

List of Lubricators--*continued*.

Fitting to be lubricated.	No.	Where situated.
Sights :—		
Bar, rocking—		
Left ... ..	1	On upper front side of arm.
Right ... ..	1	At centre of arm.
Bracket, range, left—		
Connecting shaft ... ..	3	2 on top of bracket and 1 in range-pinion bearing.
Spindle, range, worm	1	On top of bracket.
Range, worm-wheel ...	1	In cover.
Range, bevel wheel ...	1	In cover.
Bracket, range, right—		
Connecting shaft ... ..	2	1 on top of bracket and 1 in cover.
Bracket, deflection ... ..	2	1 on top of bracket and 1 in boss for deflection spur wheel axis bolt.
Bracket, telescope holder—		
Left ... ..	5	4 in front of bracket and 1 at rear.
Right ... ..	3	2 in front of bracket and 1 at rear.
Deflection arms—		
Left ... ..	1	At front.
Right ... ..	1	At front.

## 2. THE BREECH MECHANISM.

## (i) General precautions.

The breech mechanism should be dismantled periodically in order that it may be thoroughly cleaned.

The breech should be kept covered up when possible to prevent dust and grit getting into the breech fittings.

## (ii) To dismantle the breech mechanism.

*Buffer block:—*

Turn the retaining key of the buffer block to the dismantling position, as indicated by an arrow on the key and the word "dismantle" on the gun, and withdraw the buffer block by means of the "Wrench, breech mechanism, No. 97."

*Breech block:—*

(To remove the breech block, the buffer block must be removed first.)

Turn the "lever-actuating clutch" on the left side of the gun to "H" position. Prepare to receive the breech block from the lower end of the mortice and then withdraw the breech-mechanism lever handle to the rear.

Note:—The lever-actuating clutch must not be turned from the position occupied, except when the breech block, breech-mechanism lever and lever actuating breech-mechanism shaft are all fully home.

*Breech-mechanism lever; breech-mechanism lever shaft; actuating lever; latch retaining pawl, breech-mechanism lever shaft; clutch spindle; clutch actuating lever, nut and screw; extractor levers, left and right; and crank:—*

Remove the keep pin and nut from clutch spindle on left side. Unscrew the securing screw for clutch actuating nut in left under-side of breech ring, and withdraw the clutch actuating lever, nut and screw from left side of gun. Unscrew the check-screw from nut of breech-mechanism lever shaft and remove the nut and washer from left side. Remove the hinge pin from breech-mechanism lever shaft, sleeve and shaft actuating lever, and withdraw the breech mechanism, with lever shaft and clutch spindle, from right side of gun, care being taken to receive the extractor levers and crank

from the under-side of the mortice. Remove latch from lever breech-mechanism lever shaft.

**(iii) To assemble the breech mechanism.**

The breech mechanism is assembled in the reverse order.

**(iv) To dismantle the firing mechanism.**

*See that the mechanism is in the "fired" position.*—Remove the cover plate, striker cover and mainspring, slightly revolve the firing spindle to clear the sear, and lift out the striker.

Remove retaining pins of firing spindle and spindle intermediate cocking lever, remove spindles, and lift out from the recess in the block the cocking lever, sear and intermediate cocking lever.

With a screwdriver push in the retaining plug of sear plunger, turn through half-circle and remove, lift out spiral spring and plunger.

Remove fixing screw of the firing-hole bush, and with a wrench unscrew the bush.

**(v) To assemble the firing mechanism.**

The firing mechanism is assembled in the reverse order. Lines and arrows on fittings should be brought to coincide when replacing firing spindle.

The bush firing hole should be screwed home until the coned recess for fixing screw is central with the hole in breech block.

**(vi) To test the protrusion of the striker.**

The required amount of protrusion of the firing pin through the firing-hole bush is between 0.09 inch and 0.11 inch. This must be measured with the striker pressed well forward.

*To gauge the protrusion :—*

Dismount the breech block, see that the mechanism is in the fired position, remove cover plate and striker cover, lift out the mainspring.

Ease the sear by revolving the firing spindle, and push striker forward into the fired position.

Apply gauge protrusion No. 1 to the front face of the breech screw and ascertain whether the protrusion is within the limits allowed by the gauge.

Excessive protrusion can be adjusted by rubbing down the pin, and insufficient protrusion by exchanging the pin.

**(vii) To adjust the tension of breech block spring.**

Fully unscrew securing screw of "stop spring box," attach wrench No. 96 to spring box and turn latter in a clockwise direction until the correct tension is obtained. Re-tighten securing screw.

*With the MARK III GUN :—*

**(i) General Precautions.**

The breech mechanism should be dismantled periodically in order that it may be thoroughly cleaned.

The breech should be kept covered up when possible to prevent dust and grit getting into the breech fittings.

**(ii) To dismantle the breech mechanism.**

*Striker Case.*—Withdraw retaining plunger and turn to the position marked "*dismantle*" and remove. Ease spring. Drive out keep pin and unscrew nut retaining firing pin remove firing pin and main spring. Remove striker spindle to the rear. Remove the keep pin and nut from trigger sear,

take off part 2 and withdraw part 1 with spring from the inside. The retaining plunger can be removed by driving out the keep pin and unscrewing the head; the plunger and spring can then be removed.

*Breech Screw.*—Open the breech. Press in catch-retaining breech screw, open and partially revolve the screw until the handle is about 15 degrees below the horizontal; the interrupted threads are then clear of those on the carrier and the breech screw can be removed.

The catch-retaining breech screw lock, and the firing and intermediate firing levers, can be removed by unscrewing their axis screws.

*Catch-retaining Breech Screw Open.*—Remove from recess in carrier.

*Carrier.*—Remove keep pin, collar and hinge bolt and lift off carrier and bearing washer. Drive out keep pin and axis pin of cocking lever and remove lever.

*Catch-retaining Carrier.*—Drive out pin and remove catch with spring.

*Extractor.*—Remove keep and hinge pins and withdraw extractor from the inside.

*Latch-retaining Breech Screw.*—Remove screws and locking plates; then remove fixing screws and take off bracket. This leaves the firing rod free to be taken out to the rear. Take out axis screw and remove the crank lever. Drive out keep pin and unscrew and remove the plug. Remove plunger with spring, and crank-lever spring with cap.

*Lever actuating Firing Rod.*—Remove hinge screw and lever.

*Catch-retaining Cartridge.*—Unscrew plug and remove plunger and spring.

**(iii) To assemble the breech mechanism.**

The breech mechanism is assembled in the reverse order.

**(iv) To test the protrusion of the striker.**

The required amount of protrusion of the firing pin through the firing-hole bush is between 0.09 inch and 0.11 inch. This must be measured with the striker pressed well forward.

*To gauge the protrusion :—*

Open breech, press in catch-retaining breech screw open and turn breech screw to the locked position. Remove striker and examine to see if it is correctly assembled ; also clean firing-hole bush and replace striker. Easo spring. Press the striker forward into the breech screw as far as it will go and apply the gauge protrusion striker No. 1 to the front face of the breech screw, and ascertain whether the protrusion is within the limits allowed by the gauge.

Excessive protrusion can be adjusted by rubbing down the pin, and insufficient protrusion by exchanging the pin.

**3. HYDRAULIC BUFFER.****(i) General precautions.**

Care should be taken to see that the buffer is properly filled, that there is no leakage at the glands, and that the piston rod and spring-tension rods are firmly nutted up to the lug of the gun.

During severe weather, buffers should be protected as much as possible from the cold.

**(ii) In action.**

Fault.	Cause.	Remedy.
Excessive length of recoil...	Worn piston ... ..	Replace.
Violent recoil ... ..	Loss of liquid ... ..	Replenish.
Gun runs out sluggishly ...	Wrong adjustment of control valve ... ..	Re-adjust.
—	Weak or broken springs...	Replace.
Gun runs out violently ...	Loss of liquid ... ..	Replenish.
—	Wrong adjustment of control valve ... ..	Re-adjust.

**(iii) To fill the buffer.**

The gun must be placed in a horizontal position, the drain plug removed and the liquid poured in until it overflows. The drain plug must then be replaced, the gun elevated to 30 degrees, the filling plug removed and the buffer and tank filled until full; then replace the plug.

For this operation about 2½ pints of liquid are required. The liquid is composed of 80 per cent. glycerine and 20 per cent. water.

**(iv) To empty the buffer.**

Remove filling plug and drain plug, elevate the gun gradually to 90 degrees, catching the liquid in a suitable vessel. The small quantity of liquid which remains behind the drain plug can be extracted with a syringe.

**(v) Glands.**

Glands should be tightened up when necessary. It is better to do this when the cradle is warm, as the packings



then set better. They should not be over-tightened, as this may distort the rings and also cause seizures.

Control-rod gland :—Tighten up with spanner 150.

Piston-rod gland :—Tighten up with spanner 151.

**(vi) To replace packing of hydraulic buffer.**

Empty the buffer. Disconnect the piston rod and spring-tension rods from the lug of the gun by removing the split-pins and nuts, and at the same time remove the pin connecting bar actuating breech-mechanism lever shaft. Draw the gun back about 12 inches, with the gun slightly depressed, and block it up to prevent it being elevated.

*(a) To replace packing in the stuffing box :—*

Remove the steel gland, ring supporting packing and packing, clean out the stuffing box and insert the packing, replace ring supporting packing and screw up the gland.

*(b) To replace a fibre washer or a U-ring leather in the stuffing box :—*

Unscrew the gland and stuffing box and remove them from the piston rod. The fibre washer can then be removed and replaced by new, if necessary. To replace the U-ring leather, the two rings supporting packing and the ring packing leather U-section should be carefully taken out, all parts cleaned, and unserviceable parts replaced by new. Leathers should be rubbed with dubbin before insertion. The stuffing box should then be screwed up tight on its seating and the steel gland screwed up sufficiently to tighten the packing, but allowing free action of the piston rod. The gun should then be connected up and the buffer filled.

## PART II.—FIXED MOUNTING OR TRAVEL- LING PLATFORM.

### CHAPTER. VI.

#### GENERAL DUTIES.

The detachment is composed of eleven men. The service of the gun is divided between them as follows :—

1	...	...	...	In command.
2	...	...	...	Layer for line.
3	...	...	...	Layer for elevation.
4	...	...	...	Setter for vertical deflection.
5	...	...	...	Setter for lateral deflection.
6	...	...	...	Setter for tangent elevation.
7	...	...	...	At the breech.
8	...	...	...	Loader.
9, 10 and 11	...	...	...	Ammunition supply.

The duties of the section commander and each man are as follows :—

#### DUTIES OF SECTION COMMANDER.

*NOTE.—In action the section commander will only be in direct command of his section when detached.*

1. He **COMMANDS** his section and is responsible for the serviceability of its **EQUIPMENT** and the correctness of its **DRILL**.

2. He supervises the **TESTING** and **ADJUSTMENT** of the sights of his section.

3. He sees that the **BEARING SCALES** of his guns are properly **ORIENTED**.

## DUTIES OF 1.

1. He COMMANDS and is responsible for the entire service of his gun.

2. He gives the WORDS OF COMMAND detailed for him in Chapter II, and repeats all ORDERS affecting his detachment which have not been heard by the men concerned. His orders must be given clearly, but no louder than is necessary to enable his detachment to hear.

For the first round of each group he orders "Fire."

Before giving this order, he sees that his gun is in all respects ready.

He assists in passing orders down the battery when necessary.

He reports "On Target" or "Target Lost."

He acknowledges all orders by saluting. He will salute with the hand nearest the command post, finishing with the hand vertically above the head.

3. He is responsible :—

(i) That the BUFFER is properly filled, that the piston rod is firmly nutted up to the lug of the gun and the control plunger to the cradle, and that the spring tension rods are properly connected up.

(ii) That there is no leakage at the GLANDS.

(iii) That the PROTRUSION of the STRIKER is correct.

(iv) That the SIGHTS are tested. This is done under the supervision of the section commander.

To ascertain if the BUFFER is properly filled, he removes the filling-hole plug on the tank and the drain plug on the rear of the buffer and sees that the tank is full.

4. He selects the POSITION for his gun, which should be on firm and level ground. He supervises the LEVELLING of the gun.

5. He occasionally examines the setting of the DEFLECTION SCALES and TANGENT ELEVATION DIAL. .

6. He supervises the preparation and supply of AMMUNITION.

#### DUTIES OF 2.

1. He TRAVERSES and lays the gun for line by keeping the vertical wire of his telescope on the nose of the target.

2. In picking up a target, and when the target is difficult to see, he will use the open sight.

#### DUTIES OF 3.

1. He ELEVATES and lays the gun for elevation by keeping the horizontal wire of his telescope on the nose of the target.

2. In picking up a target, and when the target is difficult to see, he will use the open sight.

3. He is the MASTER-LAYER. As soon as his sight is first layed on the target he will give "On target." If for any reason the gun ceases to be layed, he will give "Target lost."

#### DUTIES OF 4.

He sets the VERTICAL DEFLECTION and corrections, as ordered.

#### DUTIES OF 5.

He sets the LATERAL DEFLECTION and corrections, as ordered.

## DUTIES OF 6.

He sets the TANGENT ELEVATION dial by keeping the reader on the fuze curve ordered.

## DUTIES OF 7.

1. At HAND LOADING, he opens and closes the breech.

To OPEN the BREECH :—He takes hold of the handle of the lever breech mechanism with his right hand, releases the catch by pressing the handle towards the gun, lowers it to the rear to the fullest extent, and releases the pressure of his hand as soon as the breech block is held by the extractors.

This is most important as it allows the next round to slide home into the chamber and be held there by the action of the buffer-block spring.

To CLOSE the BREECH :—As soon as the extractors have disengaged the breech block he raises the lever breech mechanism with his right hand to the fullest extent.

When the breech is closed he keeps his left hand on the breech ring until the gun is fired.

2. At all times he keeps the gun platform clear of empty cases.

*With the MARK III GUN* he opens and closes the breech as follows :—

To OPEN the BREECH :—He takes hold of the lever breech mechanism with his left hand, presses in the catch-retaining, raises the lever and draws it smartly towards him. After the fired cartridge case has been ejected he must not hold the breech in the fully open position, but should allow the "catch-retaining carrier open" to rest in the slot provided for it in the breech ring; otherwise 8 will be unable to load.

To CLOSE the BREECH:—He takes hold of the lever breech mechanism with his left hand and forces it smartly away from him and downwards as far as it will go. When the breech is closed, he keeps his left hand on the breech ring until the gun is fired.

#### DUTIES OF 8.

##### 1. He LOADS.

To LOAD:—He receives the round from 9 in the palm of the left hand near the point of balance, his right hand clenched against the base of the cartridge, thumb uppermost. He should hold the round with the fuze higher than the base of the cartridge. He places the head of the shell in the bore, being careful not to strike the breech, and forces the round well home until held by the action of the buffer block.

2. As soon as the first round is loaded, he sets the clutch lever to S.A. unless "Hand loading" has been ordered.

(N.B.—Great care must be taken to see that the clutch lever is never moved except when the breech is fully closed.)

##### 3. He FIRES, and turns to receive another round.

To FIRE:—He pulls the handle of the firing lever smartly to the rear as far as it will go and releases it at once.

For the first round of each group he awaits the order "Fire" from 1 before firing the gun.

He will be careful not to fire the gun after "Target lost" is given.

#### With the MARK III GUN:—

To LOAD:—He receives the round from 9 in the palm of the left hand near the point of balance, his right hand clenched

against the base of the cartridge, thumb uppermost. He should hold the round with the fuze higher than the base of the cartridge. He places the head of the shell in the bore, being careful not to strike the breech, and forces the round well home until held by the action of the catch-retaining cartridge.

2. He FIRES, and turns to receive another round.

To FIRE:—He pulls the handle of the firing lever smartly to the rear as far as it will go and releases it at once.

For the first round of each group he awaits the order "Fire" from 1 before firing the gun.

He will be careful not to fire the gun after "Target lost" is given.

#### DUTIES OF 9.

1. He receives AMMUNITION from 10 and 11, and holds the round with both hands underneath, fuze to his right.

2. He passes ammunition to 8.

3. He assists 10 and 11 in preparing ammunition.

#### DUTIES OF 10 AND 11.

1. Supply AMMUNITION to 9 with fuzes set as ordered, carrying the round with the right hand at the base of the cartridge case, and supporting it on the palm of the left hand at the point of balance.

2. Assisted by 9, they REMOVE CLIPS and FUZE COVERS, and are responsible that the FUZES are PROPERLY SET as ordered.

3. 10 keeps 1 informed as to the number of rounds required to replenish the racks.

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## CHAPTER VII.

### GUN DRILL.

This chapter details the orders given and the procedure by which these orders are carried out in batteries armed with the 3-inch (20 cwt.) Q.F. A.A. Gun on Fixed Mounting or Travelling Platform.

The procedure must be memorized and strictly adhered to.

The executive order is shown throughout as being given by the section commander, as will normally be the case during training. In action the executive order will normally be given by the fire unit commander. When orders can be heard throughout the battery, they will be acted upon without repetition. Instructors will invariably employ the orders detailed for the section commander, even when drilling a single detachment.

#### 1. POSITIONS AT DETACHMENT REAR.

The detachment falls in two deep, one pace between ranks, 1 on the right of the front rank, three yards in rear and three yards to the right of the body of the mounting. 1 is not covered.

#### 2. TO TELL OFF.

Section commander.

" . . . section—*Tell off.*"

1 numbers himself 1, the right-hand man of the rear rank 2, his front-rank man 3 and so on.



### 3. TO CHANGE ROUND.

Section commander.

" . . . section—*Change round.*"

1 takes a pace to the rear with his right foot and a pace to the left with his left foot. The left-hand man of the rear rank takes two short paces to the front. At the same time the remainder of the front rank take two short paces to the right and the rear rank two short paces to the left.

(The detachment is then again told off.)

### 4. TO EXAMINE EQUIPMENT.

Examination of equipment will be carried out before leaving the gun park. When in action, this procedure should be carried out at least once in every 24 hours, and advantage should be taken of any interval to examine and test equipment.

Section commander.

" . . . section—*Examine equipment.*"

The section commander supervises the testing of sights and grouping of ammunition.

1 sees that the bore is clear, that the gun, buffer and spring tension rods are properly connected up. He sees that the buffer is correctly filled, and that there is no leakage from the glands.

He tests and adjusts the sights.

He tests protrusion of the striker, and generally supervises the work of the remainder of the detachment, satisfying himself that spare parts are interchangeable, small stores complete, and the equipment is in all respects ready for action.

He orders 2 and 3 to test the traversing and elevating gears as soon as 7 and 8 have completed their duties.

2 removes and replaces the muzzle cover, fixes his telescope in the bracket, focusses it and sees that it is correctly adjusted. Adjusts his seat, head rest and foot rest, sees that the traversing gear is oiled, and when ordered by 1 traverses the gun through a large arc, and sees that the gear is in good working order.

He assists 1 to test and adjust the sights.

3 removes and replaces the breech cover, fixes his telescope in the bracket, focusses it and sees that it is correctly adjusted. He adjusts his seat, head rest and foot rest, sees that the elevating gear is oiled, and when ordered by 1 elevates and depresses the gun through 90 degrees, and sees that the gear is in good working order.

He assists 1 to test and adjust the sights.

4 sees that the vertical deflection scale is in good working order, leaving it set at zero.

5 sees that the lateral deflection scale is in good working order, leaving it set at zero.

6 sees that the tangent elevation dial is in good working order, and that the reader follows the zero fuze line while the gun is elevated from 0 to 90 degrees. He leaves it set at zero.

7 and 8 examine the breech and firing mechanism and test the semi-automatic gear.

They assist 1 to test the protrusion of the striker.

8 tests the firing gear.

9, 10 and 11 examine the ammunition, see that the primers are screwed home and the fuzes set as ordered.

As soon as the examination is completed the detachment form detachment rear.

1 collects reports and reports to the section commander,  
 "No. . . . ready for action" or otherwise.

#### 5. TO BRING THE GUN FROM TRAVELLING TO FIRING POSITION.

Section commanders and Nos. 1 must carefully select positions that are solid and level in order that the gun platform may rest squarely on the ground. If necessary the ground must be levelled with picks and spades.

Section commander.

" . . . section—*Lower the platforms.*"

2, 3, 4 and 5 remove front jack arms from the lorry and secure them to the platform.

10 inserts the keep pins.

6, 7, 8 and 9 go to the rear jack arms.

11 unkeys and removes rear coupling pin.

6, 7, 8 and 9 swing the rear jack arms outwards into the firing position, 6 and 7 removing and replacing keep pins.

1 orders "*Jack up.*"

2 to 9 screw down the jacks until the wheels are clear of the ground.

1 releases the wheel catches and orders "*Wheels off.*"

2 to 11 remove the wheels and roll them away clear of the gun. Even numbers at the right wheel, odd numbers at the left wheel.

1 orders "*Lower the platform.*"

2 to 9 lower the gun platform to the ground by means of the jacks and level it under the orders of 1.

10 and 11 assist with spades.

1, as soon as he is satisfied that the platform is level, orders "Remove jacks."

4, 5, 6 and 7 remove the jacks and place them under cover.

As soon as each man has completed his duties he will fall in at detachment rear.

#### 6. TO COME INTO ACTION.

Section commander.

" . . . section—Action."

2 removes muzzle cover and places it on the ready rack, removes pin securing traversing gear, fixes and focusses his sighting telescope and uncaps the foresight.

3 removes breech cover and places it on the ready rack, removes pin securing elevating gear, fixes and focusses his sighting telescope and uncaps the foresight.

He elevates the gun to 30 degrees.

4 sets the vertical deflection scale to zero.

5 sets the lateral deflection scale to zero.

6 sets the tangent elevation dial at fuze 16.

7 opens the breech, puts on knee pad and gloves.

8 puts on knee pad and loading gloves.

9, 10 and 11 open the ready racks and prepare ammunition for issue.

The detachment take up their position in action.

## 7. POSITIONS IN ACTION.

- 1 where he can best supervise his detachment.
- 2 on the seat on the right of the gun.
- 3 on the seat on the left of the gun.
- 4 on the step opposite the vertical deflection scale.
- 5 opposite the lateral deflection scale.
- 6 opposite the tangent elevation dial.
- 7 on the right rear of the breech facing the lever breech mechanism.
- 8 on the left rear of the breech facing 7.
- 9 where he can best supply 8 with ammunition.
- 10 and 11 at the most convenient ammunition racks.

## 8. TO FORM DETACHMENT REAR IN ACTION.

Section commander.

" . . . section—*Detachment rear.*"

1 doubles to his place (three yards in rear and three yards to the right of the body of the mounting) and gives the order "*No. . . . Double march.*" At the order from 1 the remainder double to their places and halt.

## 9. TO TAKE POST FROM DETACHMENT REAR.

Section commander.

" . . . section—*Take post.*"

The detachment double to their positions in action.

## 10. TO LOAD.

Section commander.

" . . . section—*Fuze. . . .*"

10 or 11 supply 9 with a round set at the fuze ordered.

9 passes the round to 8.  
 8 loads at once.  
 7 closes the breech and places his left hand on the breech ring (at hand loading only).  
 8 sets clutch lever to S.A. unless "Hand loading" has been ordered.

*With the MARK III GUN:—*

10 or 11 supply 9 with a round set at the fuze ordered.  
 9 passes the round to 8.  
 8 loads at once.  
 7 closes the breech and places his left hand on the breech ring.

#### 11. To UNLOAD.

No. 1.

"No. . . —Unload."

8 sets the clutch lever to H.  
 7 opens the breech slowly.  
 8 withdraws the round and hands it to 9, who places it on the ground.  
 10 or 11 replaces the round in the ready rack when opportunity occurs.

*With the MARK III GUN:—*

7 opens the breech slowly.  
 8 withdraws the round and hands it to 9, who places it on the ground.  
 10 or 11 replaces the round in the ready rack when opportunity occurs.

## 12. TO LAY THE GUN.

- 2 lays for line.
- 3 lays for elevation.
- 4 puts on vertical deflection as ordered.
- 5 puts on lateral deflection as ordered.
- 6 keeps the tangent elevation dial set to the fuze-range ordered.

## 13. TO FIRE.

Gun fire is the only method of fire. The executive order is "Fire," given by the section commander.

Section commander.—"Fire."

8 fires the gun. For the first round of each group, he awaits the order "Fire" from 1 before firing.

7 opens the breech (at hand loading only).

*At night.*

8 calls "Clear" and fires the gun.

7 opens the breech (at hand loading only).

The gun is loaded and fired as rapidly as possible until "Stop" is ordered or signalled by a blast on the whistle.

If the order "Fire" is preceded by an order ". . . Rounds," loading and firing will cease when the stated number of rounds has been fired without any further order.

## 14. MISS-FIRES.

*If the gun fails to fire:—*

8 satisfies himself that the breech is properly closed, re-cocks and pulls the firing lever again.

*If the gun fails to fire the second time, he calls "Miss-fire."*  
 1 orders "Stand clear." All men working in rear of the gun stand clear, the remainder continue their duties. After a pause of 1 minute:—

1 orders "Unload."

7 and 8 unload.

8 hands the round to 1, who examines the primer. If the primer has not been struck, 1 orders 7 and 8 to change the striker.

*If the primer has been struck,*

1 hands the round to 10 or 11, who lays it on the ground about 10 yards clear.

The normal service of the gun is resumed.

#### 15. FRESH TARGET.

Section commander.

" . . . section—*Fresh target.*"

2 and 3 lay the gun on the new target.

4 and 5 set the deflection scales to zero.

6 sets the tangent elevation dial to fuze 16.

7, 8 and 9 unload.

#### 16. SCALES ZERO.

Section commander.

" . . . section—*Scales zero.*"

4 and 5 set the deflection scales to zero.

#### 17. TO STOP FIRING.

Section commander.

" . . . section—*Stop*" (or one blast on the whistle).

8 stops loading and firing.

The remainder of the detachment continue their duties.



## 18. CHANGE OF FUZE.

Section commander.

" . . . section—Fuze. . . ."

6 sets the tangent elevation dial to the fuze range ordered.

8 hands his round to 9, who lays it on the ground with his own round. 9 receives from 10 or 11 a round set at the new fuze, which he passes to 8. If empty, the gun is loaded with a round set at the new fuze. If already loaded, the gun is not unloaded.

## 19. CEASE FIRING.

Section commander.

" . . . section—Cease firing."

7 and 8 if the gun is loaded, unload.

4, 5 and 6 bring their scales to zero.

7 closes the breech.

2 and 3 bring the gun horizontal.

9, 10 and 11 replace ammunition and close the ready racks.

## 20. CEASE FIRING—REPLACE STORES.

Section commander.

" . . . section—Cease firing—replace stores."

7 and 8, if the gun is loaded, unload.

4, 5 and 6 bring their scales to zero.

7 closes the breech.

2 and 3 bring the gun horizontal, replace pins securing traversing and elevating gears and caps protecting foresights, unship their sighting telescopes and replace muzzle and breech covers.

9, 10 and 11 replace ammunition and close the ready racks.  
Stores are replaced under the orders of 1, who then brings his detachment to detachment rear and stands them at ease.

#### 21. TO BRING THE GUN FROM FIRING TO TRAVELLING POSITION.

Section commander.

" . . . section—*Raise the platforms.*"

4, 5, 6 and 7 fetch the jacks and place them in position in the jack arms.

2, 3, 4 and 5 double to the front jack arms.

6, 7, 8 and 9 double to the rear jack arms.

10 and 11 opposite the axles.

Even numbers on the right side, odd numbers on the left.

1 orders "*Jack up.*"

2 to 9 screw down evenly on the jacks until the gun and platform are raised sufficiently to take the wheels.

1 raises the retaining catches and orders "*Wheels on.*"

Even numbers go to the right wheel, odd numbers to the left wheel, and replace them in the travelling position.\*

1 engages the retaining catches and orders "*Lower the platform.*"

---

\* Great care must be taken in replacing the wheels to avoid burrs on the brass bracket beneath the pedestal. The axle should be inserted and pushed carefully home to within 3 inches of the full amount; the axle will then have entered the brass bracket. A violent push is then necessary to send the wheel right home.

2 to 9 lower the platform by means of the jacks until the weight is taken by the wheels. They then screw the jacks right up to allow maximum ground clearance.

6, 7, 8 and 9 swing rear jack arms into the travelling position, 6 and 7 removing and replacing keep pins.

11 keys up.

10 removes keep pins of the front jack arms.

2, 3, 4 and 5 remove front jack arms and place them in the lorry.

The rear jack arms are coupled to the lorry, 11 inserting the coupling pin and key.

The detachment takes up position at detachment rear.

1 reports "No. . . . gun ready to move."

## 22. CASUALTIES TO DETACHMENTS.

Men sent to replace casualties report to their section commanders, who order such changes of duties as they consider necessary.

Casualties are replaced as follows:—

Section commander ...	By the senior No. 1 of the section.
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1 ... ..	By a named successor.
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With ten men ...	5 performs the duties of 5 and 6.
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With nine men ...	8 performs the duties of 7 and 8, unless the S.A. mechanism is out of action, in which case 1 performs the duties of 1 and 4.
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The service of the gun requires a minimum of five men at the gun (six at hand loading). Ammunition numbers should

not be used to replace casualties until the numbers at the gun fall below this figure.

*With the MARK III GUN :—*

Casualties are replaced as follows :—

Section commander ... By the senior No. 1 of the section.

1 ... By a named successor.

With ten men ... 5 performs the duties of 5 and 6.

With nine men ... 1 performs the duties of 1 and 4.

The service of the gun requires a minimum of six men at the gun. Ammunition numbers should not be used to replace casualties until the numbers at the gun fall below this figure.

### 23. DISABLEMENT.

The extent of disablement ordered will depend upon the time available and the probability of recapture.

1. *To disable the gun so that it can be brought into action immediately after recapture.*—Remove the breech screw, or block.

2. *To disable the gun so that it can be brought into action after repair.*—Bring gun to the horizontal, disconnect buffer and recuperator, then fire the gun.

3. *To destroy the gun.*—Place a fuzeed H.E. cartridge in the muzzle. Remove the time fuze from a second H.E. cartridge and load this cartridge in the chamber; the gaine or D.A. fuze being in position. Close the breech. Disconnect the buffer and elevate to 70 or 80 degrees. Then, by means of a long lanyard, fire the gun from under cover. A length of telephone wire attached to the service lanyard is suitable for the purpose.

NOTE.—The telescopes should always be removed and taken away before abandoning a gun.

#### 24. BLANK AMMUNITION.

1. No officer, N.C.O. or gunner who has not been trained and passed in gun drill is to command a section or form part of a gun detachment firing blank ammunition at salutes or at training.

2. When firing Q.F. blank ammunition, the cartridge is on no account to be left in the gun with the breech open.

3. In the event of a miss-fire, a further attempt should be made to fire the gun. In no case must the breech be opened for at least one minute with black powder, and ten minutes with smokeless charges. No one must be in rear of the breech when it is opened.

In firing salutes, an officer or senior N.C.O. should be detailed for the special duty of timing the interval after a miss-fire and informing 1 of the gun when the breech may be opened.

4. As a further safeguard, 1 will inspect all ammunition before firing, to see that the charge is properly home in the case.

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